

### ABSTRACT OF THE DISCLOSURE

A heat pump system (10) including a heat generator (15), a heat engine (26) supplied with heat engine working fluid (18) by the heat generator (15) having a heat engine cylinder chamber (34), a heat engine piston (32), and a heat engine piston rod (35), a preheating chamber (31) employing the heat engine working fluid (18) to heat the heat engine cylinder chamber (34), a compressor (40) driven by the heat engine (26) employing compressor working fluid having a compressor cylinder chamber (46), a compressor piston (44), and a compressor piston rod (47), a spacer (50) separating and joining the heat engine piston rod (35) and the compressor piston rod (47), a sealing assembly (38) associated with the spacer (50) separating the heat engine working fluid (18) and the compressor working fluid, and a valve assembly (60) communicating with the heat engine cylinder chamber (34) and controlling the ingress and egress of heat engine working fluid (18) to the heat engine (26).